

REMARKS

Claims 1, 3-6 and 8-12 are pending in this application. By this Amendment, claims 1, 6, 11 and 12 are amended and claims 2 and 7 are canceled. Claims 6 and 11 are amended to correct a typographical error therein.

No new matter is added to the application by this Amendment. The features added to claims 1, 6, 11 and 12 find support in canceled claims 2 and 7.

Reconsideration of the application is respectfully requested.

I. Rejection Under 35 U.S.C. 103

Claims 1-12 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent Publication No. 2002/0007022 to Oosedo et al. (hereinafter "Oosedo") in view of U.S. Patent Publication No. 2005/0271874 to Sakajiri et al. (hereinafter "Sakajiri"). This rejection is respectfully traversed.

Prior to discussing the merits of the Examiner's position, the undersigned reminds the Examiner that the determination of obviousness under § 103(a) requires consideration of the factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1 [148 USPQ 459] (1966): (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any, of nonobviousness. *McNeil-PPC, Inc. v. L. Perrigo Co.*, 337 F.3d 1362, 1368, 67 USPQ2d 1649, 1653 (Fed. Cir. 2003). There must be some suggestion, teaching, or motivation arising from what the prior art would have taught a person of ordinary skill in the field of the invention to make the proposed changes to the reference. *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988). But see also *KSR International Co. v. Teleflex Inc.*, 82 USPQ2D 1385 (U.S. 2007).

A methodology for the analysis of obviousness was set out in *In re Kotzab*, 217

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F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000) A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher."

It must also be shown that one having ordinary skill in the art would reasonably have expected any proposed changes to a prior art reference would have been successful. *Amgen, Inc. v. Chugai Pharmaceutical Co.*, 927 F.2d 1200, 1207, 18 USPQ2d 1016, 1022 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988); *In re Clinton*, 527 F.2d 1226, 1228, 188 USPQ 365, 367 (CCPA 1976). "Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure." *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988).

The Patent Office acknowledges that Oosedo does not disclose that the carbon fiber is impregnated with a sizing agent in the amount of 0.3 to 5% by mass comprising a vinyl ester resin (see page 3 of the Office Action). The Patent Office introduces Sakajiri as allegedly teaching (1) a sizing agent for a carbon fiber strand for a carbon fiber reinforced resin composite material comprising vinyl ester resin present in the amount of 0.3 to 5% by mass and (2) that the sizing agent affects the adhesion of the carbon fibers and the matrix. Moreover, the Patent Office alleges that it would have been obvious to

impregnate the carbon fiber strand in Oosedo with a sizing agent as disclosed in Sakajiri in order to have a carbon fiber reinforced resin composite that has superior interlaminar strength. Applicants respectfully disagree with these allegations.

Neither Oosedo nor Sakajiri, taken singly or in combination, teaches or suggests a resin mixture having a curing agent (C) comprising an organic peroxide curing agent and a curing agent for epoxy resin as required by amended claims 1, 6, 11 and 12.

Oosedo discloses a thermosetting resin composition for carbon fiber-reinforced composite material, comprising a thermosetting resin (A) and a compound (B). The thermosetting resin (A) of Oosedo is an epoxy resin, or a compound having, in the molecule, a plurality of unsaturated bonds (see claim 3 of Oosedo).

Oosedo does not teach or suggest an epoxy group-containing vinyl ester resin (which is a constituent (A) of the presently claimed resin mixture) having, in the molecule, both an epoxy group and an ethylenically unsaturated group. Moreover, in the specification of Oosedo, there is no description of any epoxy group-containing vinyl ester resin having, in the molecule, both of epoxy group and an ethylenically unsaturated group.

In Examples 1-11 and Comparative Examples 1-4 of Oosedo, epoxy resins are described as thermosetting resins (A). These epoxy resins of Oosedo have no ethylenically unsaturated group in the molecule. These thermosetting resin compositions for carbon fiber-reinforced composition material, described in Examples 1-11 and Comparative Examples 1-4 of Oosedo, each contain about 5 parts "dicyandiamide" which is a curing agent for epoxy resin. However, these thermosetting resin compositions in Examples 1-11 and Comparative Examples 1-4 of Oosedo contain no organic peroxide as

a radical polymerization initiator. Failure to contain organic peroxide as a radical polymerization initiator indicates that the epoxy resins of the Examples 1-11 and Comparative Examples 1-4 of Oosedo contain no ethylenically unsaturated group.

In Examples 12-18 and Comparative Example 8 of Oosedo, vinyl ester resins are described as the thermosetting resins (A). Incidentally, Comparative Examples 5 to 7 do not exist in Oosedo. These vinyl ester resins in Examples 12-18 and Comparative Example 8 have no epoxy group in the molecule. The compositions of Examples 12-18 and Comparative Example 8 of Oosedo contain an organic peroxide (which is a radical polymerization initiator) and cobalt naphthenate (which is a radical polymerization promotor). However, the compositions of Examples 12-18 and Comparative Example 8 fail to contain any curing agent for epoxy resin.

As set above, Examples 1-18 and Comparative Examples 1-4 and 8 of Oosedo teach a curing agent for epoxy resin or for an organic peroxide for vinyl ester that is used depending upon the epoxy resin or vinyl ester resin used. Use of a curing agent for epoxy resin or an organic peroxide for vinyl ester proves that (1) the thermosetting resins of Oosedo contain only an epoxy group or a vinyl group, and (2) the thermosetting resins of Oosedo fail to contain an epoxy group and a vinyl group.

Thus, Oosedo clearly differs from the presently claimed resin mixture because Oosedo does not teach or suggest use of (a) an epoxy group-containing vinyl ester resin that has, in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group and (b) a curing agent which comprises both of an organic peroxide curing agent and a curing agent for epoxy resin. Nowhere does Sakajiri remedy the deficiencies of Oosedo because Sakajiri also fails to teach or suggest the

claimed epoxy group-containing vinyl ester resin and the claimed curing agent comprising an organic peroxide curing agent and a curing agent for epoxy resin as recited in claims 1, 6, 11 and 12.

Tables 1 and 2 in the present specification illustrate criticality of having, in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group for the epoxy group-containing vinyl ester resin recited in claims 1, 6, 11 and 12.

Comparative Examples 2, 3 and 5 of the present application have less than 0.3 equivalent of epoxy group and greater than 0.7 equivalent of ethylenically unsaturated group. Comparative Example 4 has greater than 0.8 equivalent of epoxy group and less than 0.2 equivalent of ethylenically unsaturated group. Examples 1-5 of the present application have, in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group as required by the present claims.

The table set forth below illustrates the data (extracted from Tables 1 and 2 of the present application) for Examples 1-5 and Comparative Examples 2-5 of the present application.

	Wettability	Bending strength	Impregnability
Comparative Examples			
2	M	800	G
3	B	560	B
4	G	650	G
5	M	800	G
Examples			
1	G	920	G
2	G	940	G
3	G	950	G
4	G	900	G
5	G	930	G

As shown in the Table above, Comparative Examples 2, 3 and 5 are inferior in both wettability and bending strength when compared to wettability and bending strength for Examples 1-5. Bending strength is particularly inferior in all Comparative Examples 2-5 when compared to Examples 1-5 of the present application. Impregnatability of Comparative Example 3 is inferior when compared to Examples 1-5.

Neither Oosedo nor Sakajiri teaches or suggests that there are great improvements in wettability, bending strength and/or impregnatability when the epoxy equivalent of epoxy group-containing vinyl ester resin is between 0.3 and 0.8 and the ethylenically unsaturated equivalent of epoxy group-containing vinyl ester resin is between 0.2 and 0.7. Further, neither Oosedo nor Sakajiri teaches or suggests that the composite material produced using the present invention composition for production of carbon fiber-reinforced resin composite material is high in wettability and bending strength.

Because the features of independent claims 1, 6, 11 and 12 are not taught or suggested by Oosedo nor Sakajiri, taken singly or in combination, these reference would not have rendered the features of claims 1, 6, 11 and 12 obvious to one of ordinary skill in the art.

For at least these reasons, claims 1, 3-6 and 8-12 are patentable over the applied references. Thus, withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 3-6 and 8-12 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to

place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Early and favorable action is earnestly solicited.

CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, Applicants request that this be considered a petition therefor. Please charge the required petition fee to Deposit Account No. 14-1263.

ADDITIONAL FEE

Please charge any insufficiency of fees, or credit any excess, to Deposit Account No. 14-1263.

Respectfully submitted,
NORRIS MCLAUGHLIN & MARCUS, P.A.

By /Brian C. Anscomb/
Brian C. Anscomb
Reg. No. 48,641
875 Third Avenue, 18th Floor
New York, New York 10022
Phone: (212) 808-0700
Fax: (212) 808-0844